

Mirage 2000

*for AMT Olympus jet engine
or Jet Cat P 200*

Assembly Manual

AVIATION DESIGN

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INTRODUCTION

The *Mirage 2000* is a famous French delta fighter built by Dassault Aviation. It is used in a lot of countries and it is one of the most agile fighters. The Mirage 2000 has a single jet engine.

You love very big models, you love fighter, you love agile and aerobatic jets, you love power : The 1/5 *Mirage 2000* is for you.

The *Mirage 2000* model is really incredible in flight. It is a very big models, very aerobatic with good roll rate and incredible high angle of attack possibility. Flight is very reallistic and impressive with big turbine sound and afterburner lights.

The *Mirage 2000* from AVIATION DESIGN is fully CAD designed. Most of the plug parts were CNC machined.. It is a scale model, with all the panel lines and rivets engraved in the fuselage. Plug was covered with aluminium sheet to have scale apparence. It contains many scale details, (gears, hinges, cockpit...).

The *Mirage 2000* is designed for the new high thrust jet engines and incorporates special inlets and ducting.

Of course the *Mirage 2000* is fully molded in composite, and pre assembled : model is painted in mold, all bulkeads are glued, all control surfaces are hinged. No important gluing are required.

The *Mirage 2000* has a removable nose cone and a large canopy for an easy access to radio. The large fuselage hatch gives also an excelent access to the turbine, fuel sytem and tailpipe.

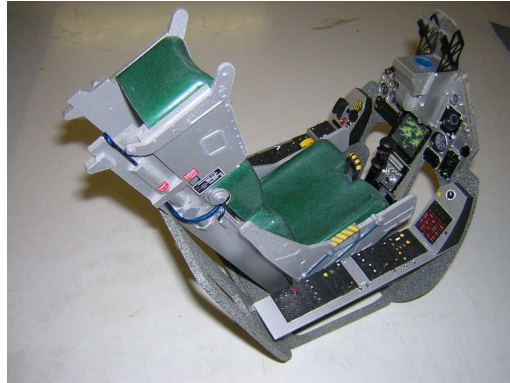
KIT FEATURES :

- High quality, grey gel-coated epoxy-glass fuselage. All the panel lines are engraved. The fuselage is in 2 parts for an easier building.
- Nose cone in fiber.
- Exhaust nozzle in fiber.
- Canopy frame in 2 parts in fiber.
- Access hatch requiring no additional framework.
- 2 Epoxy-glass inlets fitted and glued.
- 2 Wings molded in epoxy under vaccum with carbon reinforcement, high quality plywood spare, aluminium tube and gear support fitted.
- Fully molded composite fin.
- Scale fiber details.
- ABS cockpit interior and scale accessories.
- Clear formed canopy.
- Aluminium joining tubes.
- Instructions in English.



Parts required to complete the kit :

- **Cockpit detail kit** incl. 1/5 ejector seat & scale instrument panel.



- **Scale retractable landing gear** incl. 2 main retracts + 1 front steering retract + air control system + 3 scale oleo legs. All gears are CNC machined and aluminium casting. Very strong and reliable for grass operation.



- **Wheels set + brakes** incl 2 main wheels + 2 front wheels, aluminium hub + bearings + scale brakes + air control system.



- **Gear doors set** incl. air cylinders, air control system, gear door sequencer and door hinges.
- **Kevlar fuel tanks** (4.2 liters) + **BVM** upper tank.



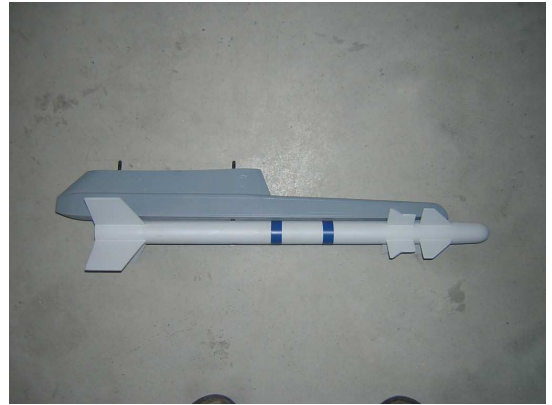
- **Details set** incl. refueling probe, 2 guns and 8 scale hinges.



- **Stainless steel double walled tailpipe.**



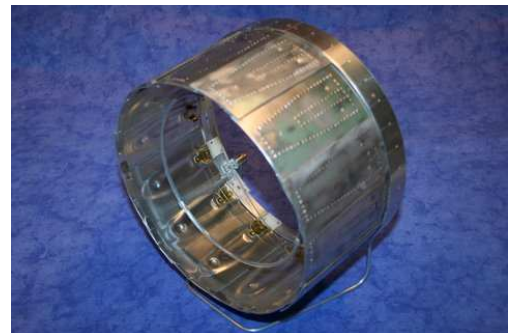
- **2 Magic missiles + wing tip launch rails.**



- **2 Mica missiles + wing launch rails.**
- **2 Mica missiles + fuselage launch rails.**

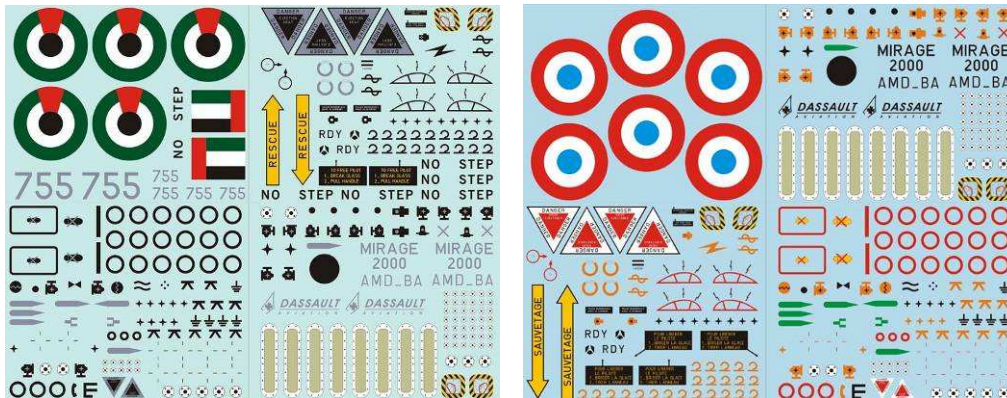
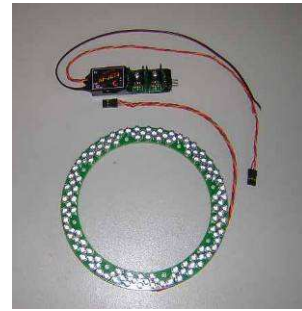


- **1 Centerline fuel tank + launch rail.**
- **2 large underwing fuel tanks + launch rails.**
- **Variable section aluminium tail cone.**

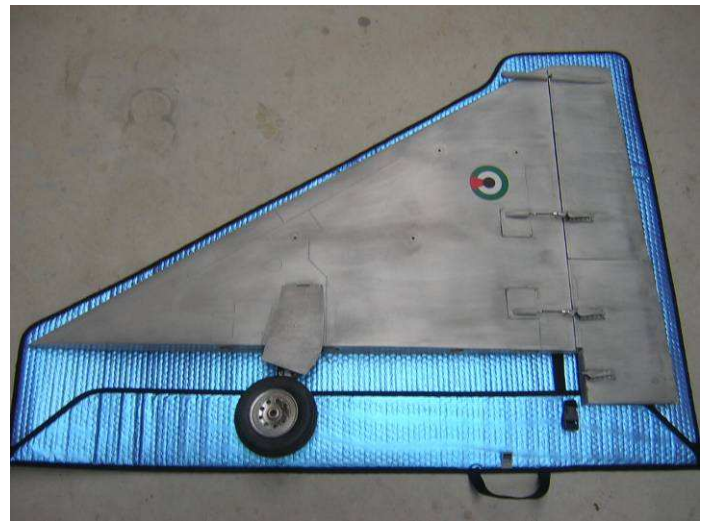


- Afterburner ring lights.

- Water decals french air Force.
- Water decals UAE air Force.



- Protection covers.



Jet Engine :

1 AMT Olympus engine
or 1 Jet Cat P180 – P200 jet engine

DISCLAIMER

AVIATION DESIGN assumes no liability for the operation and use of these products.

The owner and operator of these products should have the necessary experience and exercise common sense. Said owner and operator must have a valid Model Airplane license and insurance, as required.

FIBREGLASS PREPARATION

The inside of the fuselage should be sanded with fresh #80 grit paper for best glue adhesion where bulkheads and other attachments are fixed.

GLUING TECHNIQUES

All the plywood formers should be fitted with cyano adhesive and then glued with epoxy and glass fiber tape. All other parts should be glued with epoxy.

It is possible to let the fuselage in 2 parts for transportation.
You can also glue the 2 parts together.

If you want to dismantle it easily, you'll have to screw the 2 parts together with 6 x 4 mm diameter screws + blind nuts.

Don't forget to glue the - screws with threadlock before to fly

CONSTRUCTION

FRONT FUSELAGE

Front Gear Doors and guns :

Guns :

We recommend to fit guns first so the fuselage keep the exact section before to cut big gear doors :

Cut guns as engraved panel lines

Glue resin guns with CA inside the fuselage

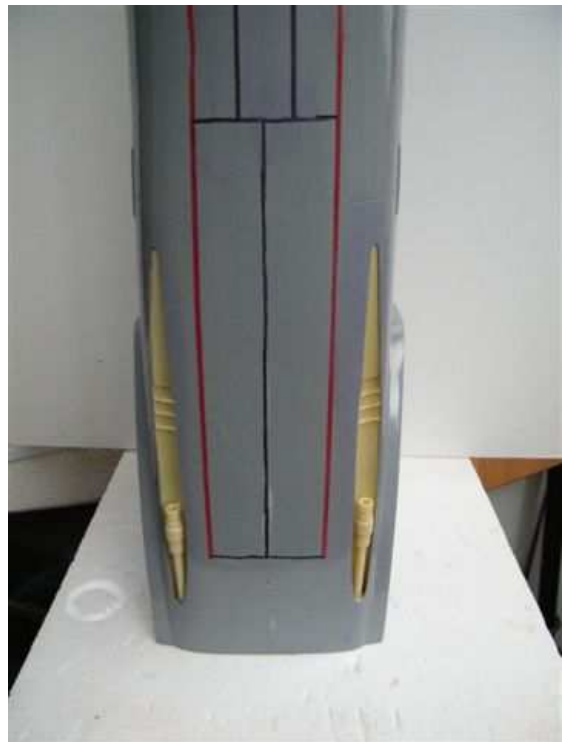
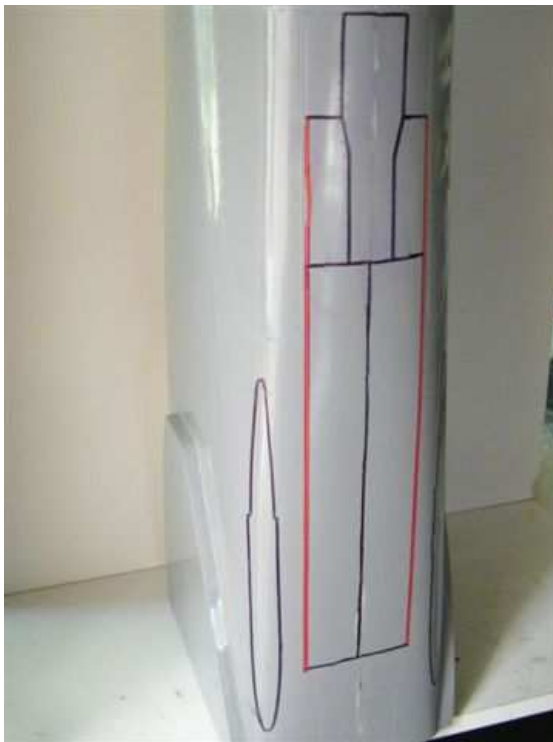
Doors :

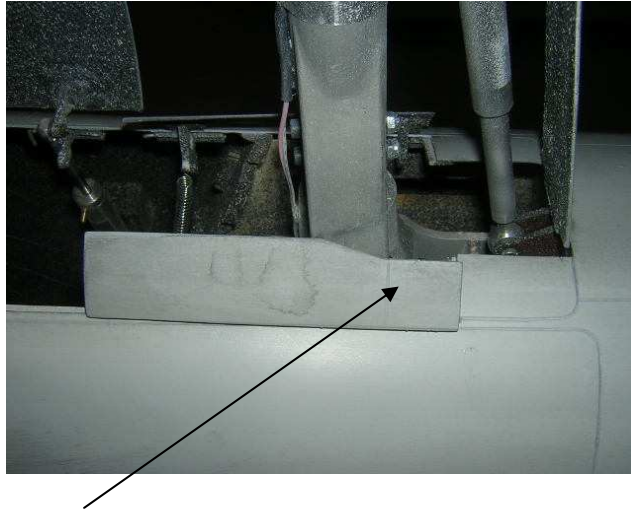
Cut just one side (left) of the main front gear door according to the engraved panel lines and photos.

Glue the 3 door hinges with cyano.

Finish to cut the front gear door.

Cut the central front door to the engraved panel lines and photos and put a flat door hinge for opening





Cut the 2 side doors 15 mm longer than the engraved panel line (for easier gear movement rotation)
Glue the 4 door hinges with cyano.

Secure all door hinges with
small parker screws



Air cylinder

Fit the small air cylinder on the front
door hinge

2Side doors will be closed by a
spring

Assembling the nose gear

Screw the landing gear on the plywood

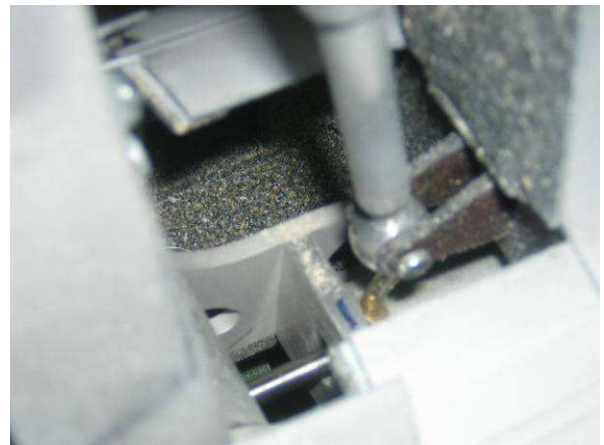
Fit the leg in the gear

Screw the 2 wheels

Glue the lights

Front came :

Glue the 2 control horn in the wood this the came screw in



Main gear doors :

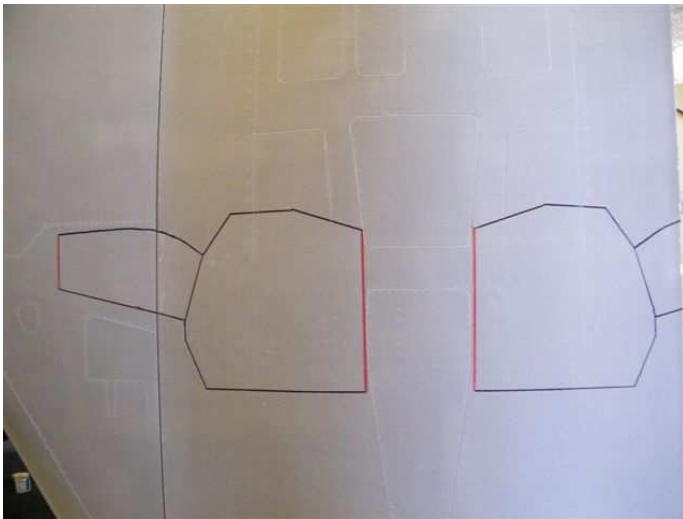
Cut the outer main gear door according to engraved panel lines and photos

Cut just one side of the main gear doors according to the engraved panel lines and photos. Cut them only close to the gear door hinge position.

Glue the 4 metal door hinges with cyano (take care of the position according to the plan and photos .

Finish to cut the main gear doors.

Secure all door hinges with small parker screws (due to aerodynamic loads)



Glue the plywood door reinforcement to the gear door

Glue the gear door cylinder plywood support to the fuselage

Screw the long air cylinder both ends to the plywood supports

Check the gear door can open and closed without trouble

Open the fuselage according to the photo to have clearance for the main air cylinder

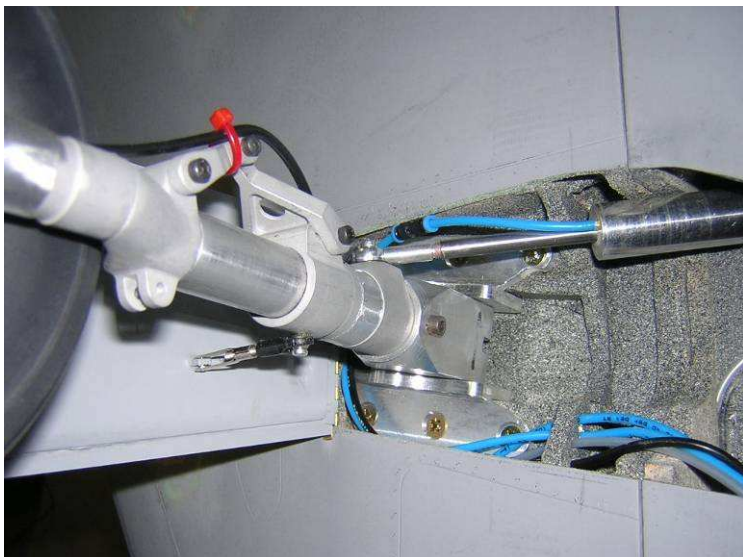


WINGS

Cut the inner main gear door according to engraved panel lines and photos
Screw the landing gear box on the plywood

Fit the leg in the gear

Screw the wheels



LANDING GEAR :

Assemble the wings to the fuselage .

Fit the oleo legs on the aluminum box.

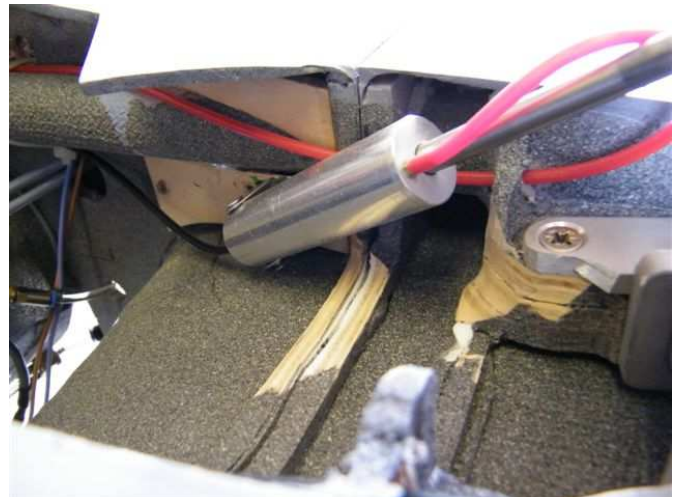
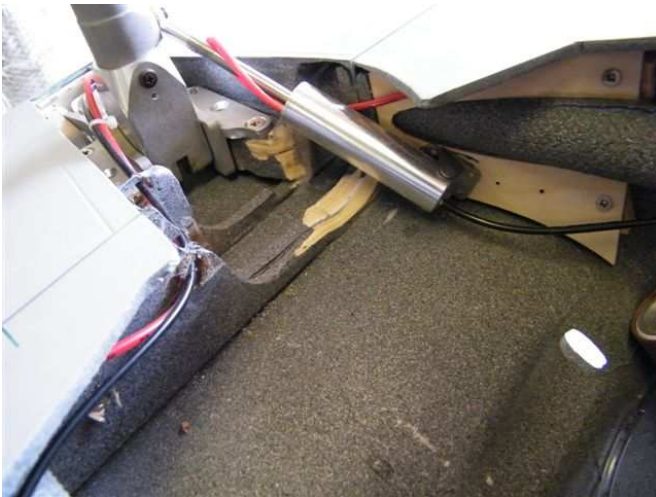
Check that the 2 wheels are parallel. Drill a 2.5 mm hole through the leg and the aluminum T to fix the leg to the box.

Screw the main air cylinder to the plywood cylinder support
Fit the mounting in the fuselage and connect the ball link to the leg.

Check that the legs perfectly retract and extend without hard point.

You may have to sent a little the wing ply reinforcement to have a perfect retraction. You can also adjust the retraction angle

If retraction is OK, you can glue the mounting in the fuselage with CA.



Note : on the aluminium ball link, the steel ball can be removed from one side

Screw the ball to the legs definitively

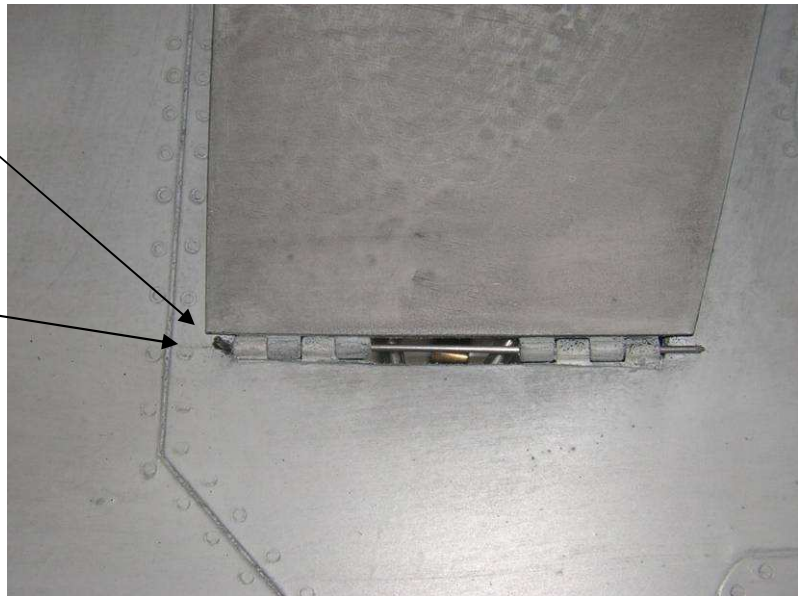
To assemble and disassemble the model on the field, you can just plug or unplug the ball to the link

Gear doors (wheels):

Glue the 2 plywood doors together.

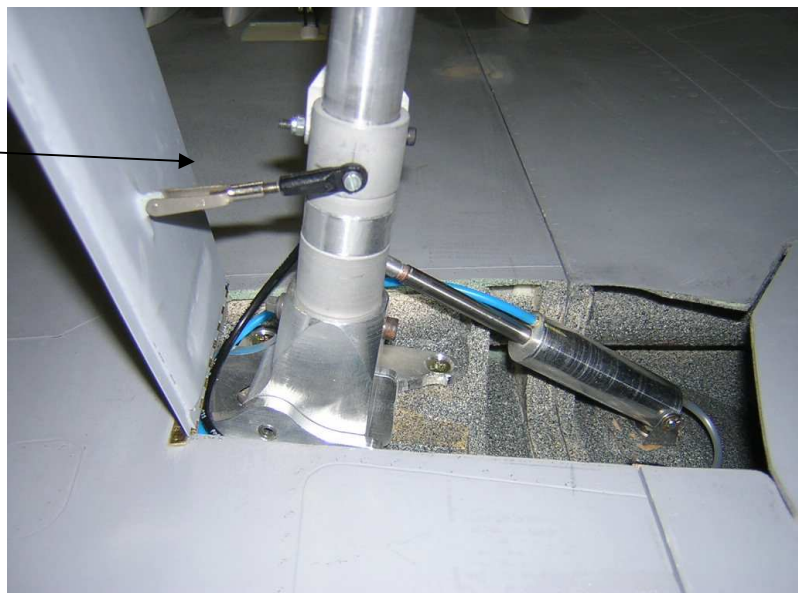
Insert 2 flat hinges between the 2 plywood layers

Insert the hinges in the wing skin



Connect the door to the leg with a M3 link + threaded rod + M3 ball link

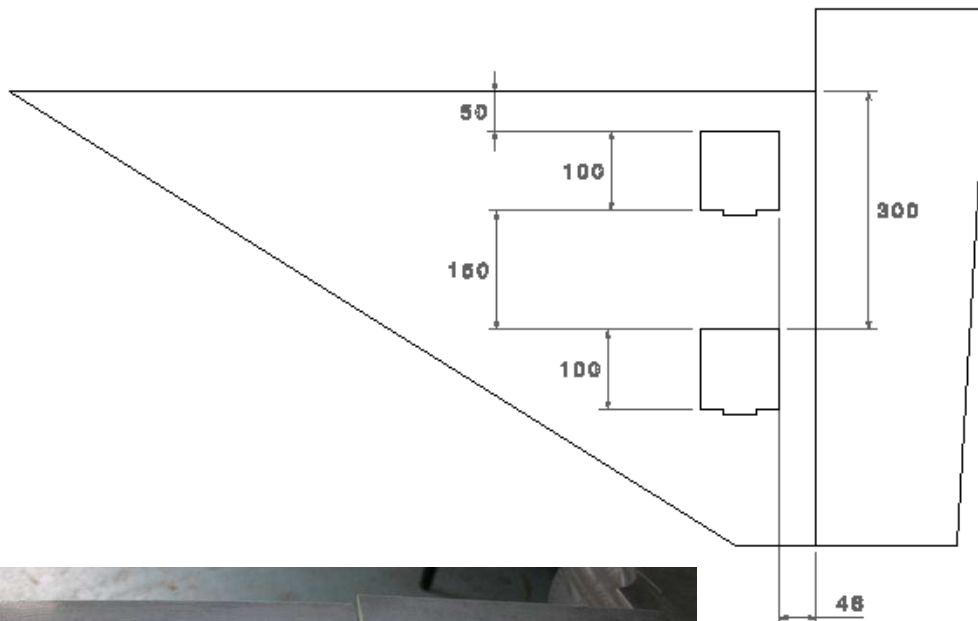
Adjust the length so the door close perfectly when the gear close



Wings servos

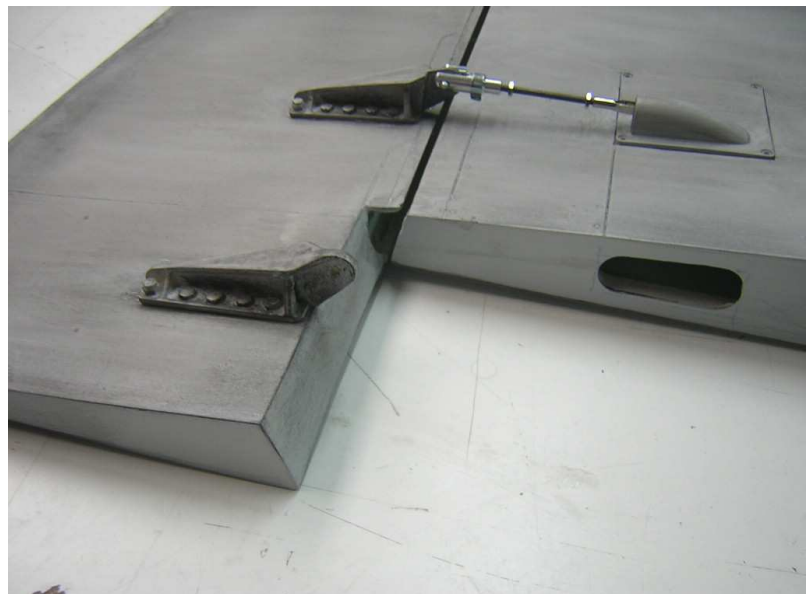
Servos **MUST** be very high quality servos, minimum 25 kg torque, with metal gear

Cut the servo location according to engraved panel lines and photos



Screw the servo in the servo cover
(we recommend to glue it with
silicon glue or strong glue)
Put in position the servo cover on the
wings
Drill 4 x 1 mm hole in the wings for
the screws

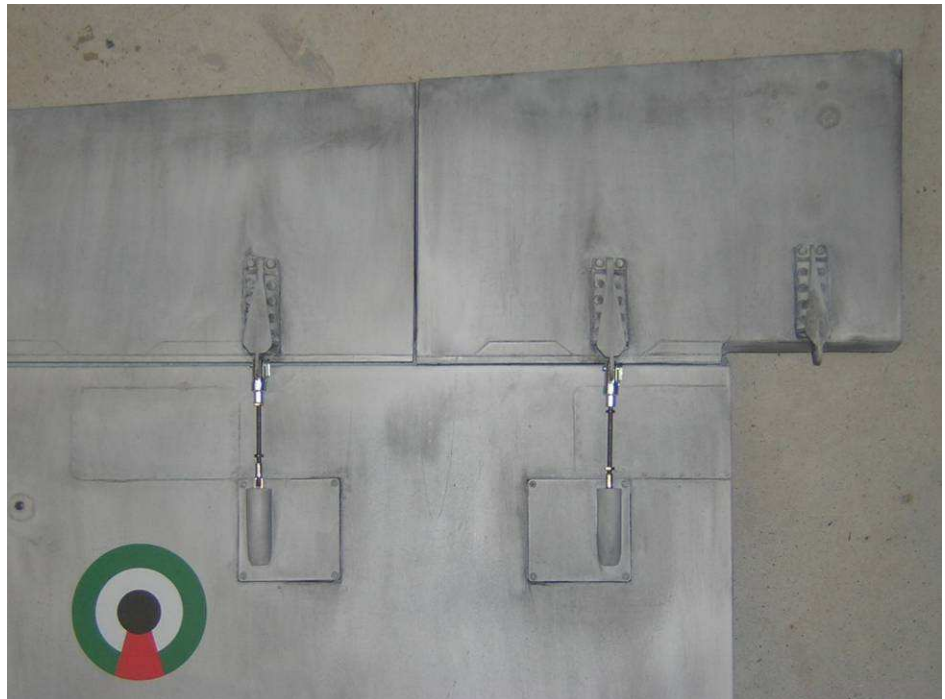
Cut a slot in the control surface for
the fiber control horn
Glue with fast epoxy the control horn
Connect M3 mm metal link with M3
threaded rod + M3 aluminium link



Glue a scale resin control horn on each side of the fiber control horn

Screw the servo cover with the 4 parker screws

Connect the servo with the control horn
Apply thread lock.



Wings tubes

Shorter wing tube fit in the front of the plane

Bigger section wing tube fit in the rear of the plane (to support gear loading).

Wings locking system :

Assemble the plane

Drill a 4 mm diameter hole through the fuselage root and wing root from the gear door

Fit a M4 blind nuts in the wing and glue it with epoxy.

When you will assemble your model on the airfield, you will have to put the model inverted, open the main gear door and fit the screws to secure the wings. Don't forget them



Assembly of the fin :

Fit the rudder on the fuselage

To secure the rudder, drill a 2.5 mm hole and insert a 3 mm screw to lock the fin.

Rudder :

It is possible to fit a rudder on the fin.
If you have choose to fit a rudder take care to have no play in it. Otherwise, you risk tail flutter.

Cut the rudder according to the engraved line with a dremel saw (fine saw).

Glue a 10 mm large balsa rib in the fin and a 10 mm large balsa rib in the rudder with fast epoxy

Position 4 hinges and glue them with a lot of epoxy.

Servo location:

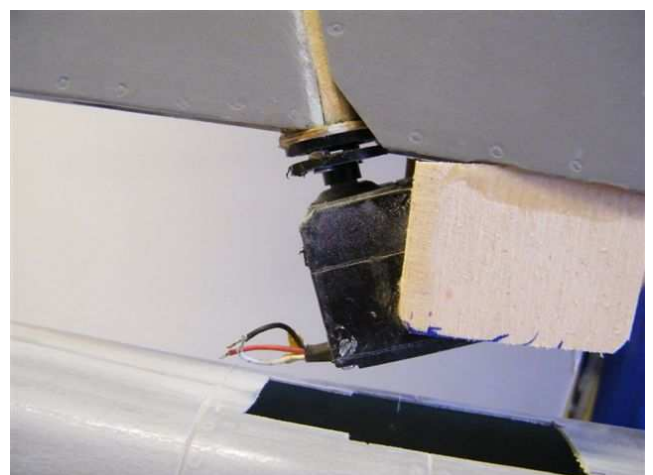
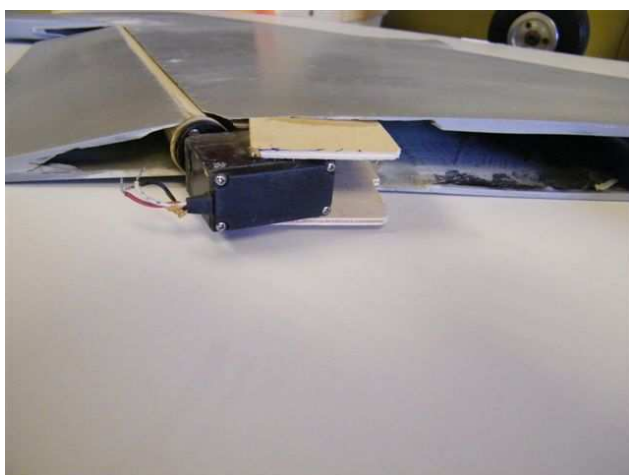
You have 2 possibility : Fit the rudder on one side of the rudder or fit the servo in the bottom of the rudder.

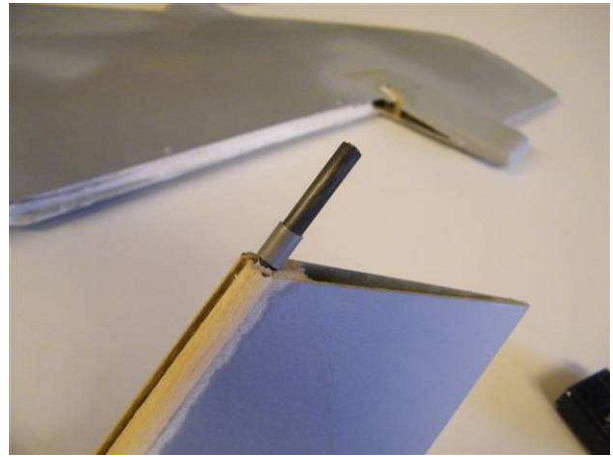
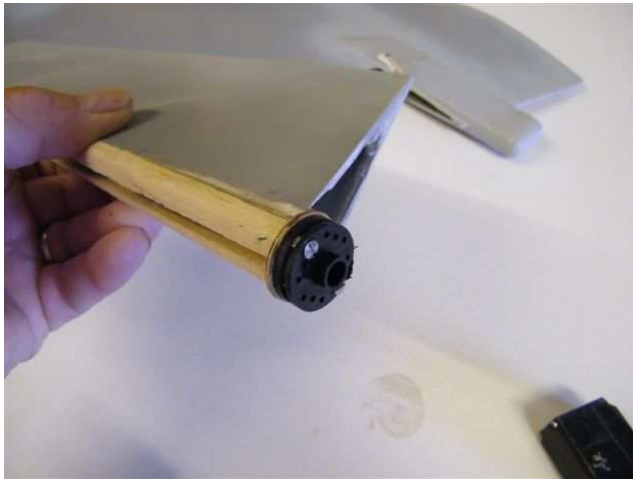
Servo in the bottom :

Servo is on the bottom of the rudder on 2 plywood mounts

Servo is directly connected to the rudder (no link)

Servo is a 25 kg.cm



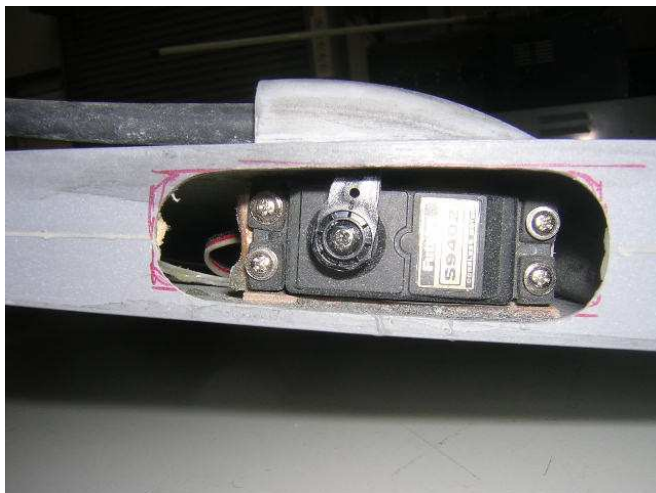
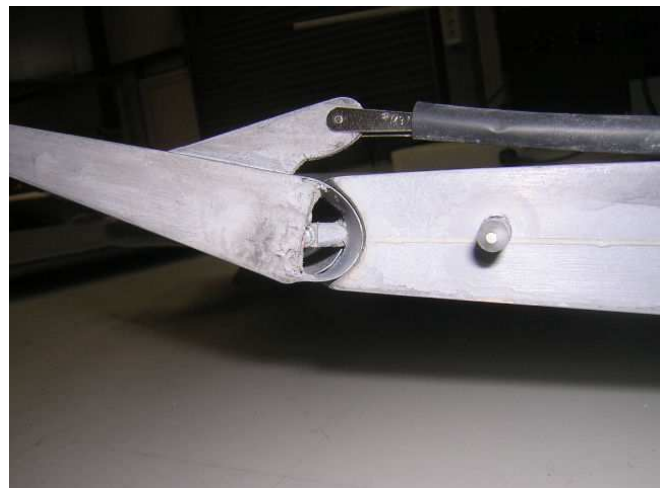


Servo in the rudder :

Servo is fitted in one side of the rudder

Access of the servo is from the bottom of the rudder (to be open)

Servo is a 12 kg.cm with M3 link



INLETS

Sand the inlet edge and air intake edge to remove loose fibers.

Put the inlets in the fuselage. The inlets should jut out over the air intakes by a few mm.

Remove the inlets from the fuselage and apply some epoxy to the inlets and the air intakes.

Put the inlets in the fuselage.

Put some clothes pegs on the edges of the inlets in the fuselage and in the air intakes.

Let them dry overnight.

Remove the surplus inlet from the air intakes.



Inlet shock cone

Glue the plywood reinforcement in the fiber part.

Glue the shock cone in the middle of the inlet.
Secure it with parker screws from inside the fuselage



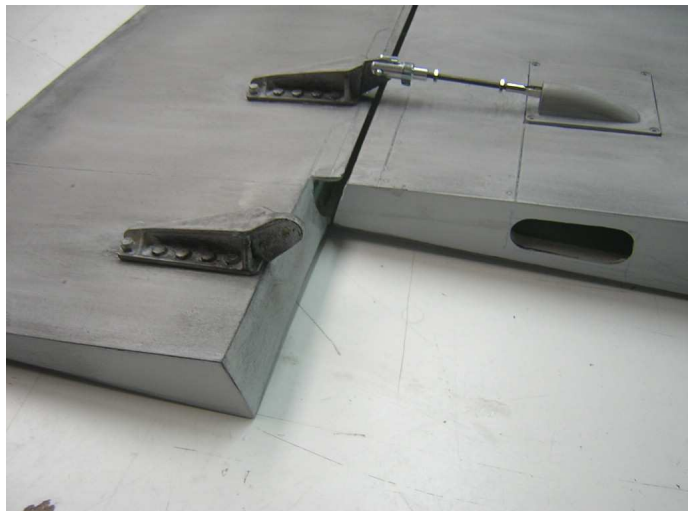
Air tubing :

Connect the air cylinders and retracts according to the manual.
Connect the gear door air cylinders according to the manual.

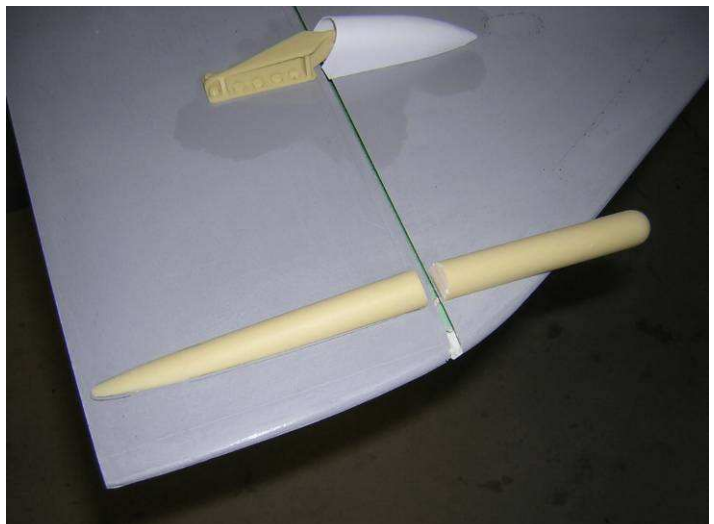
Finishing wings :

Sand the internal elevons to have up and down throws.

Position the 8 scale hinges and fairing and glue them with CA.



Glue the wing tip pod



FUSELAGE HATCH

Glue 2 wood hatch pins with CA.

Glue the hatch latch and drill the corresponding hole in the fuselage.

Glue the plywood reinforcement in the hatch



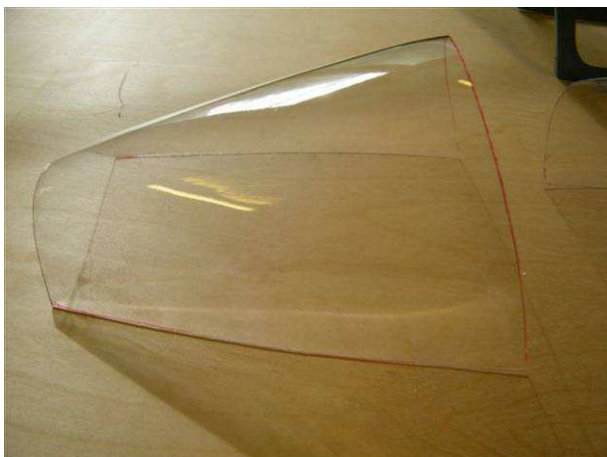
FIBER CANOPY

Cut fiber canopy as engraved.



CLEAR CANOPY

Put fiber canopy inside the clear canopy
Draw with a pen the limit of the canopy.
Cut the canopy as drawn



CANOPY in one part

Drill 2 hole for the front canopy pin.
Drill one hole for the hatch latch.



Glue with CA the ABS cockpit interior parts and paint them in black.

Glue the canopy on the canopy frame with ZAP canopy.

Glue the hatch latch to the fuselage.

OPENNING CANOPY

Drill 2 hole for the front canopy pin.
Drill one hole for the hatch latch.



frame.

Glue a flat hinge to the rear of the canopy frame

Make a slot in the fuselage for the hinge.

Glue the 2 canopy on the 2 canopy frames with ZAP canopy.

Glue 2
small hatch
latches to
the canopy



Cockpit detail kit :

Assemble the ejector seat as the photo :

Cut the vacuum parts as shown

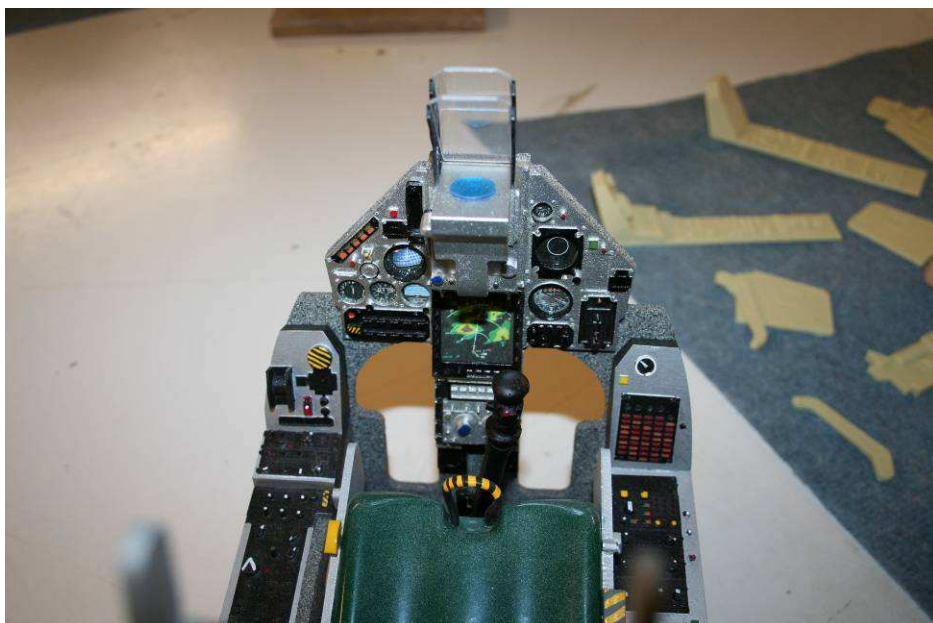
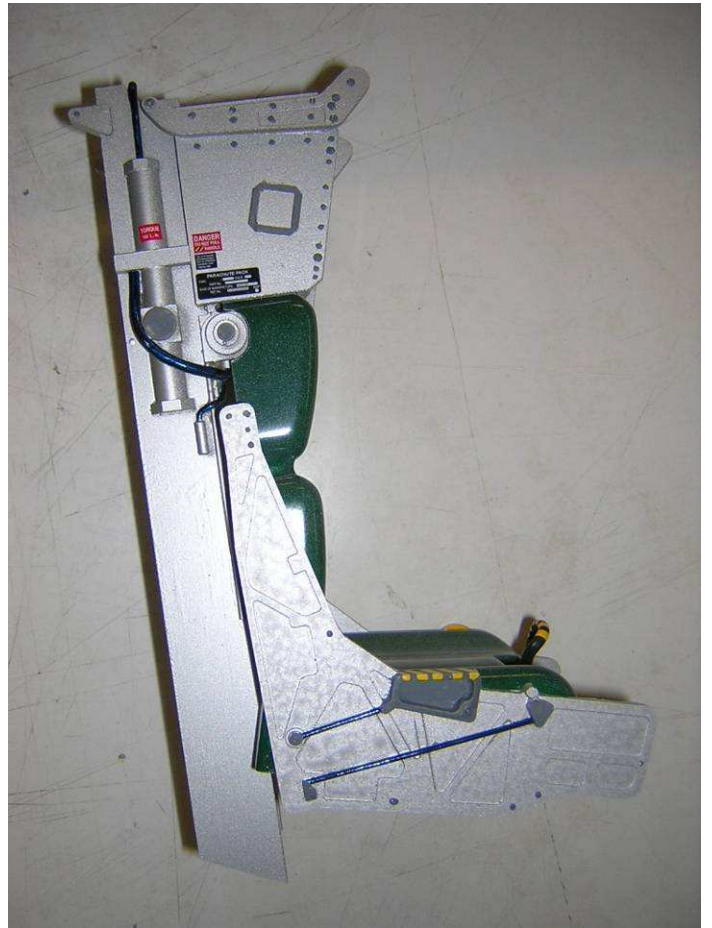
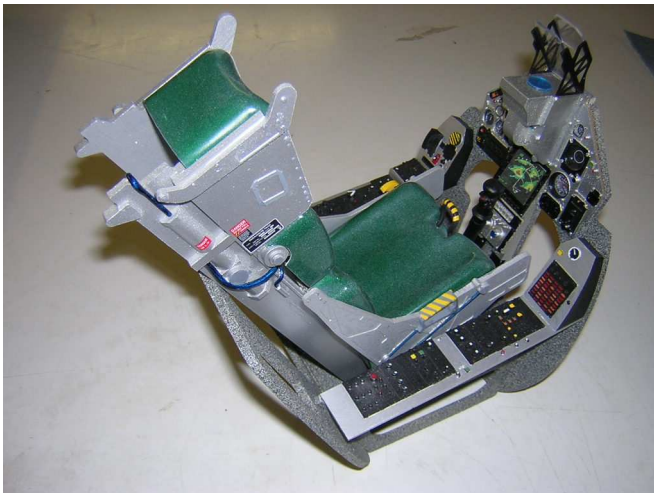
Glue with CA the 2 vacuum parts and the 2 plastic parts according to the plan.

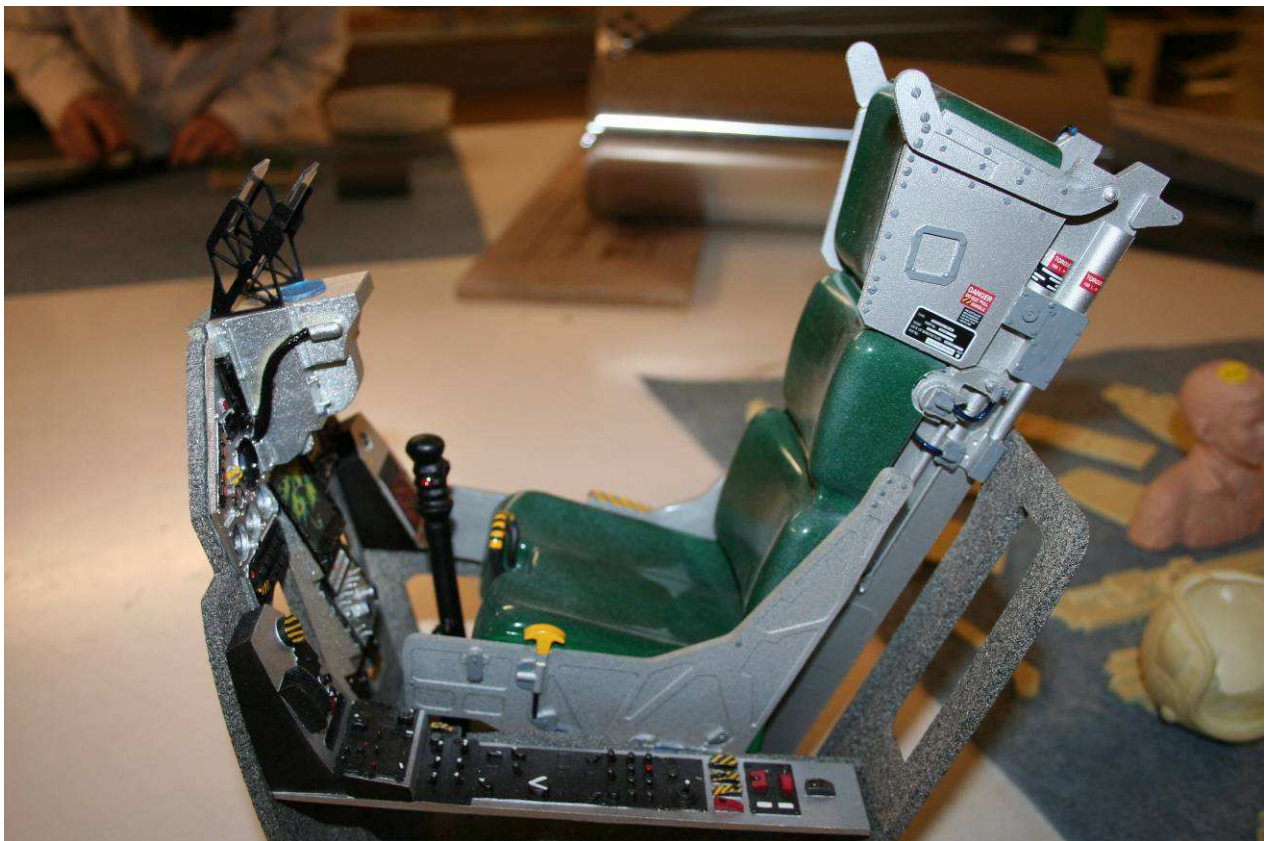
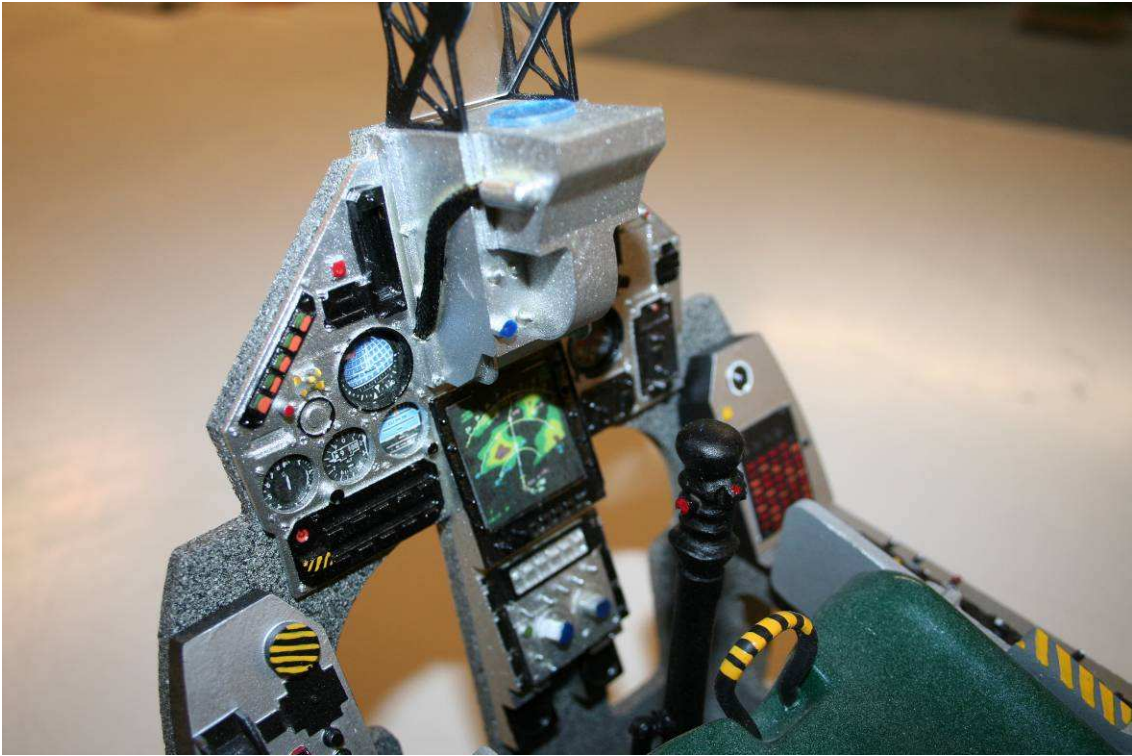
Glue with CA the plastic part at the rear of the ejector seat.

Fit all the part in the cockpit

Fit the instrument panel and HUD.

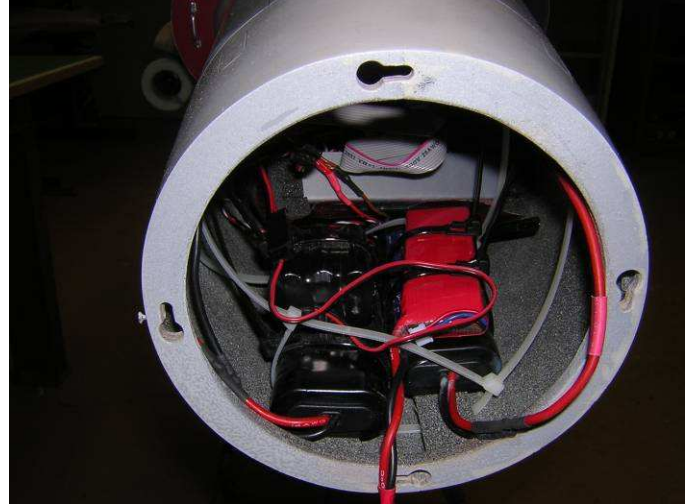
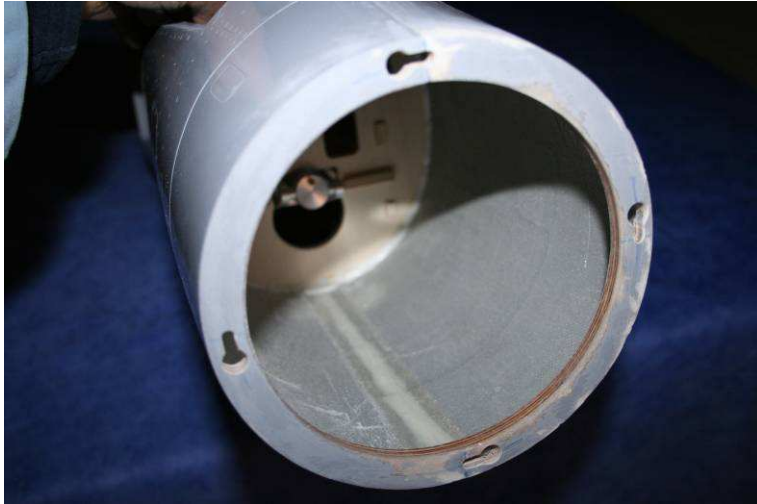
Fit the ejector seat in the cockpit.





NOSE CONE

Fit 4 screw at 90° in the nose cone
Make 4 corresponding slots in the nose
Just secure the nose for flying
There must be nothing in the nose for correct CG



TAILPIPE EXHAUST

Fit the exhaust in the plane
Put 3 screws at 90° on the front frame to hold it



TAILCONE

You can fit the standard fiber tailcone of the special scale aluminium variable section exhaust cone

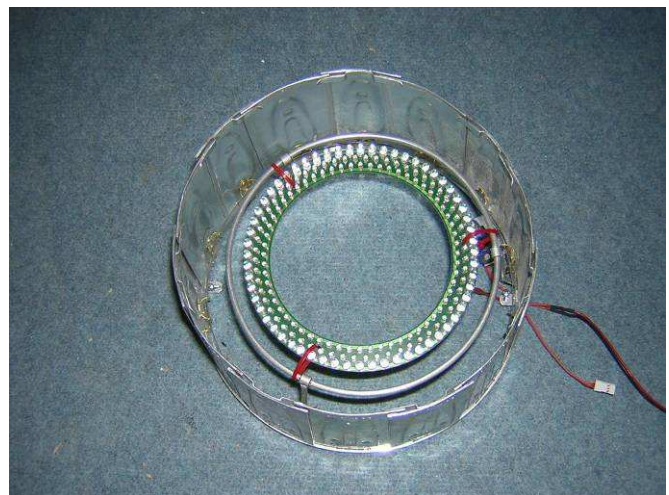
The fiber cone, just fix it at the rear of the plane

The aluminium one, you have to cut the rear fuselage to fix it to the rear plywood frame



AFTERBURNER LED

Just hold the led afterburner with 3 plastic bracket



Missiles

If you want to install the missiles under the wings, you have to glue some blind nuts in the wings at the correct location engraved on the wings.



FINISHING TIPS

Now you have to remove the wax from all the parts to paint.

The best way to do this is to sand all the surfaces with a "scotch brit" scouring pad used to wash up the crockery

All the parts can also be sanded with #400 grit paper to remove wax.

ABS and plastic parts (details set)

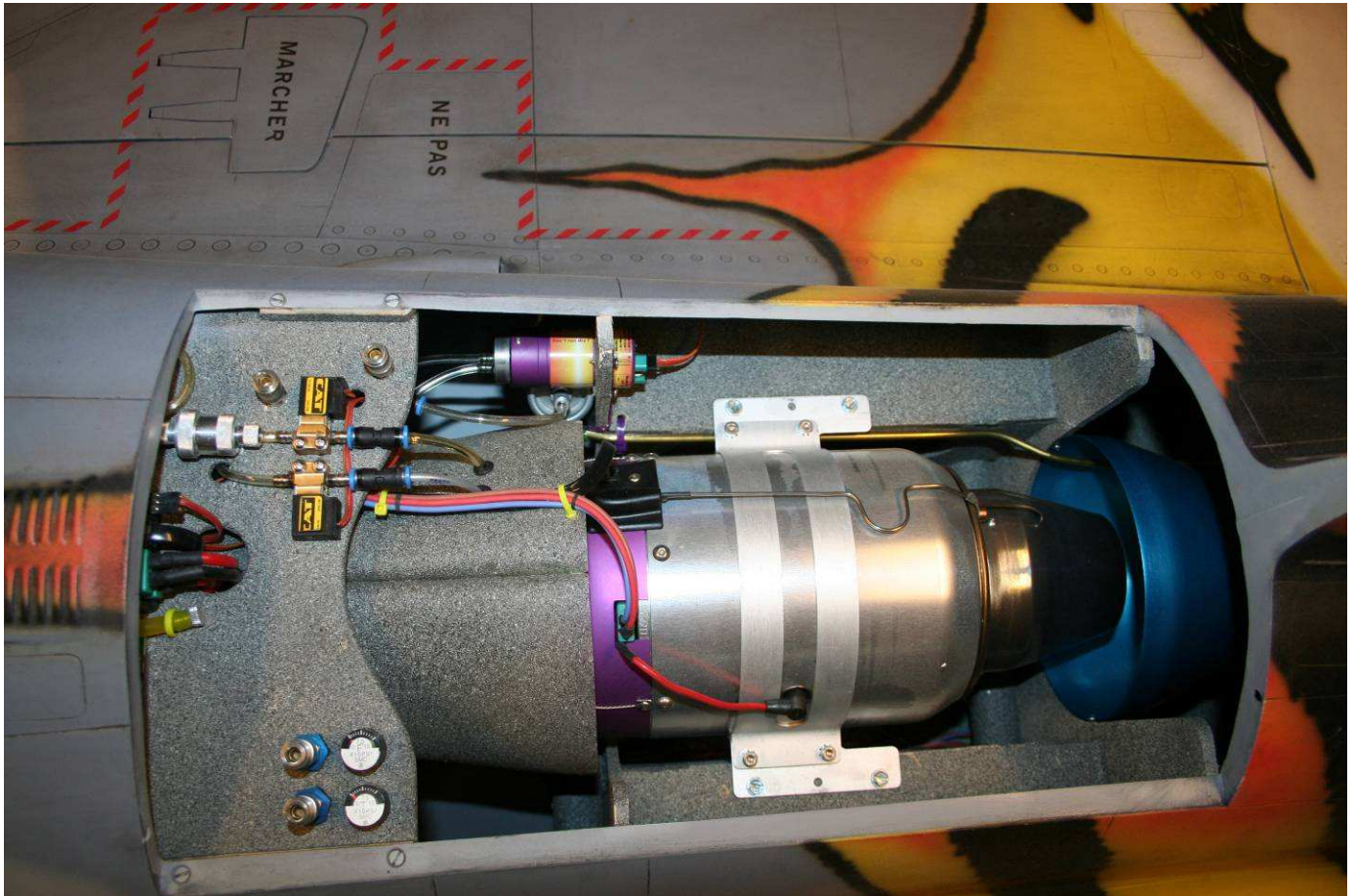
All the parts can be glued with CA



Installation of the TURBINE.

The turbine is just screwed with 4x 3mm diameter screws on the plywood mount.

The engine exhaust cone should go inside the exhaust pipe from about 2 cm .



The fuel pump is fitted on one side of the fuselage just in the fuselage hatch.

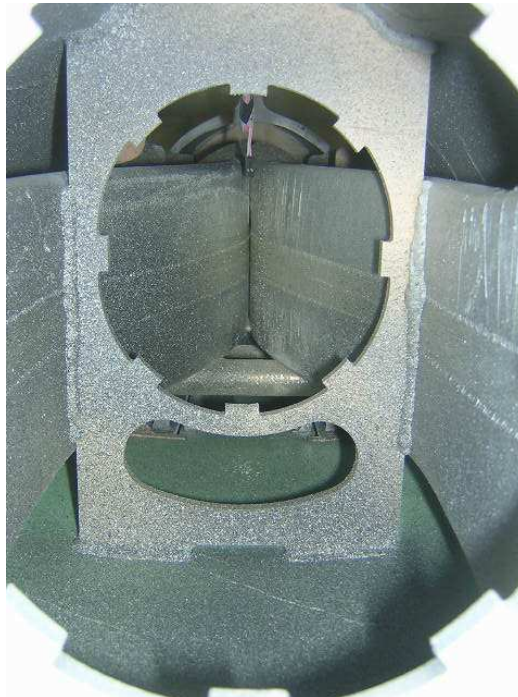
The ECU and valves can be in front of the engine on a plywood plate

The engine battery is in front of the fuselage.

Fuel tank

Fuel tank is held between 2 plywood frames

Rear frame should be glued in the fuselage between the 2 inlet ductings



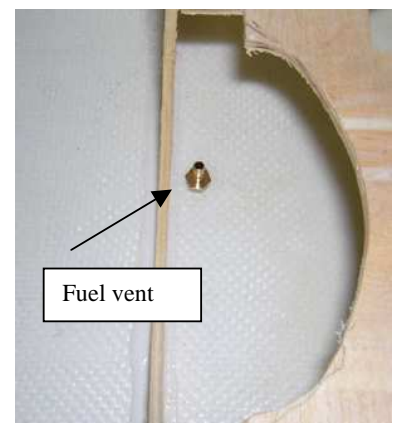
Connect the fuel tank to the clunk as the photo.
Check that there is no leak before to fit it in fuselage.

Drill a 3 mm hole in the bottom of the fuselage for the fuel vent

The fuel tank is connected to the UAT catch tank to be sure that there is no bubble in the fuel line. The tubing from the main tank to the catch tank and to the catch tank to the fuel pump must be gasoline tubing (no silicone tubing). Also for the air vent tube.

The catch tank is glue with double face tape or with rubber band on the top of the main tank or on one side.

Hold the fuel tank with rubber bands or silicon glue



Do not apply primer on the fuselage, wings and fin.

They must be directly painted.

Think light : excessive paint build-up will add unnecessary weight to the model. Apply light, thin coats of paint and sand between coats to avoid excess weight.

Radio installation :

The Mirage needs a minimum of 5 good servos :

For the elevons, we **strongly recommend** to fit 4 servos (30 kg.cm torque) : 2 servos per wing

NG steering : 1 servo 9 kg torque

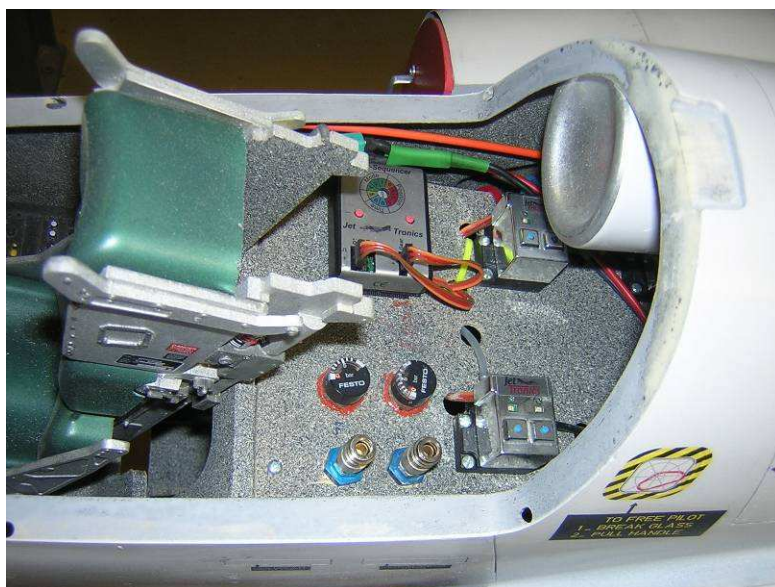
Retract + gear doors + brakes : 3 electrovalves

Fit the radio in the nose section with batterie.
Adjust batterie position to have to correct CG position.

Don't put the receiver and aerial antennae too close the the ECU

Retract valve and brake valve can be fitted as the pics

We also recommend the use of a Power box system or similar system required for the big number of high torque servos



You also need 1 electronic mixers on your radio.

You must mix the 2 elevons like a delta.

When you pull the stick back, the trailing edge of the elevons should go up.

Recommended surface throws :

Ailevons in pitch :

Up : 56 mm Down : 25 mm

for take off

Exponential: 50

Up : 35 mm Down : 25 mm

for normal flight

Exponential: 50

Ailerons in roll :

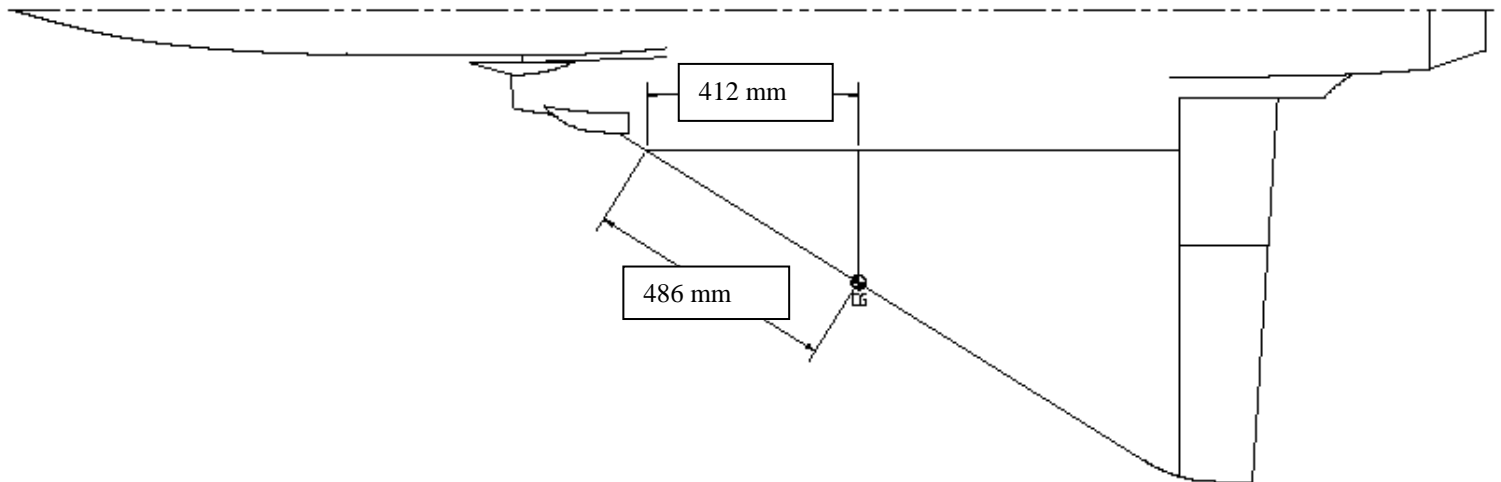
20 mm left and 20 mm right

Exponential: 20

All measured in the widest part of the surface

Center of gravity

You normally need 2 x 4000 Mah battery + ECU battery in the nose to have a correct Centre of Gravity.



Note : balance the model with the gear down and the tanks empty.

The center of gravity (CG) must be located at 486mm rear of the wing leading edge . It is the maximum rear position

You can use 470 mm as forward position

You must check it before the first flight, to do this with the aircraft in flight condition but without fuel lift the aircraft in this point, the aircraft must adopt a horizontal attitude. If the tail drops move the batteries forward or add weight in the nose.

In other hand if the nose drops considerably add weight in the tail or put batteries backward.

Total weight

The total weight of the MIRAGE 2000 is 20 to 21 kg tanks empty.

Important note : Pay very careful attention to structural integrity. This jet can reach speeds of over 400 KPH - 250 MPH. It is your responsibility to operate it safely.

Specifications may change without notice.